

# THE UNIVERSITY OF ALABAMA

## INVITATION FOR BID

### **T054209 TRIMBLE NETR9 GNSS REFERENCE RECEIVER**

ADDENDUM #1  
December 3, 2014

**ATTENTION:** This is not an order. Read all instructions, terms and conditions carefully.

<b>IMPORTANT: RESPONSE TO RFP MUST BE RECEIVED BY Thursday, December 11, 2014 @ 2:00 P.M. CST</b>
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**Offeror must acknowledge receipt of this and any addendum as stated in the Invitation  
For Bid.**

The following shall become part of the Invitation For Bid.

Please be advised that we have extended the opening date for this bid from Friday, December 5, 2014 to Thursday, December 11, 2014.

All other specifications will remain the same. Please advise Sharon O'Neal at [soneal@fa.ua.edu](mailto:soneal@fa.ua.edu) if you have any questions.

The IFB may be found at <http://purchasing.ua.edu/pdfs/PendingBids/T054209.pdf>

# THE UNIVERSITY OF ALABAMA

## INVITATION FOR BID

**ATTENTION: This is not an order. Read all instructions and terms and conditions carefully.**

<b>INVITATION NO.:</b>	<b>RETURN ALL COPIES OF BIDS TO:</b>
<b>Issue Date:</b>	<b>THE UNIVERSITY OF ALABAMA</b>
<b>Title:</b>	<b>PURCHASING DEPARTMENT</b>
<b>Buyer:</b>	<b>(Street Address) 1101 Jackson Ave Suite 3000</b>
<b>Phone:</b>	<b>Tuscaloosa, Alabama 35401</b>
<b>Email:</b>	<b>OR</b>
	<b>(Mailing Address) Box 870130</b>
	<b>Tuscaloosa, Alabama 35487</b>
	<b>PHONE: (205)348-5230 FAX: (205) 348-8706</b>

**Bid Responses may NOT be faxed or emailed.**

**IMPORTANT: SEALED BIDS MUST BE RECEIVED BY 12/5/2014 @ 2:00 P.M. CST TIME**

**Bid number and opening date must be clearly marked on the outside of all bid packages.**

1. Pursuant to the provisions of the State of Alabama Competitive Bid Law, Section 41-16-20 and/or 39-2, rules and regulations adopted there under sealed bids will be received on the items noted herein by The University of Alabama Purchasing Department until the date and time stated above. In accordance with Alabama State Bid Law Section 41-16-27, where applicable, the University reserves the right to enter into negotiations within thirty (30) days of the bid opening.
2. The University's [General Terms and Conditions](#) and [Instructions to Bidders](#), apply to this Solicitation and shall become a part of any contract issued hereunder.
3. For purposes of this Solicitation, the Solicitation documents shall consist of the following components:  
a) Invitation for Bid and any Addenda; b) [General Terms and Conditions](#); c) [Instructions to Bidders](#)  
In the event that any provision of the component parts of the Solicitation conflicts with any provision of any other component parts, the component part first enumerated shall govern.
4. This Agreement and any disputes hereunder shall be governed by the laws of the State of Alabama without regard to conflict of law principles.

### CERTIFICATION PURSUANT TO ACT NO. 2006-557

Alabama law (section 41-4-116, code of Alabama 1975) provides that every bid submitted and contract executed shall contain a certification that the vendor, contractor, and all of its affiliates that make sales for delivery into Alabama or leases for use in Alabama are registered, collecting, and remitting Alabama state and local sales, use, and/or lease tax on all taxable sales and leases in Alabama. **By submitting a response to this solicitation, the bidder is hereby certifying that they are in full compliance with Act No. 2006-557;** they are not barred from bidding or entering into a contract pursuant to 41-4-116, and acknowledges that The University of Alabama may declare the contract void if the certification is false.

### DISCLOSURE STATEMENT

1. If you or any owner, officer, partner, board or director member, employee, or holder of more than 5% of the fair market value of your firm or any member of their households is an employee of The University of Alabama, this information must be included in your solicitation response. Failure to disclose this information in your response may result in the elimination of your proposal from evaluation.
2. If you or any owner, officer, partner, board or director member, employee, or holder of more than 5% of the fair market value of your firm or any member of their households is an employee of The University of Alabama; and you or your firm is awarded a contract as a result of this solicitation, then within ten (10) days after the contract is entered into, you agree to file a copy of that contract with the State of Alabama Ethics Commission in accordance with Code of Alabama, Section 36-25-11 and upon request by the University furnish evidence of such filing.
3. By accepting payments agreed to in any purchase order resulting from this bid, Contractor certifies that to its knowledge no University employee or official, and no family members of a University employee or official, will receive a benefit from these payments, except as has been previously disclosed, in writing, to the University on the Disclosure Statement of Relationship Between Contractors/Grantees and Employees/Officials of The University of Alabama.

### AUTHENTICATION OF BID AND STATEMENT OF NON-COLLUSION AND NON-CONFLICT OF INTEREST

I hereby swear (or affirm) under the penalty for false swearing as provided in Code of Alabama 6-5-180 that

1. In accordance with Code of Alabama Section 41-16-25, amended 1975 that the attached response has been arrived at independently and has been submitted without collusion with, and without any agreement, understanding or planned common course of action with, any other vendor of materials, supplies, equipment or services described in the Invitation for Bids, designed to limit independent bidding or competition;
2. The contents of the bid or bids have not been communicated by the bidder or its employees or agents to any person not an employee or agent of the bidder or its surety on any bond furnished with the bid or bids and will not be communicated to any such person prior to the official opening of the bid or bids.
3. The bidder is legally entitled to enter into contracts with The University of Alabama and is not in violation of any prohibited conflict of interest, including those prohibited by the Code of Alabama 13A-10-62, as amended 1975.
4. I have fully informed myself regarding the accuracy of the statement made above.

### THIS AREA MUST BE COMPLETED

<b>DELIVERY AFTER RECEIPT OF ORDER:</b>	<b>NAME OF COMPANY:</b>	<b>PHONE:</b>
<b>FEDERAL EMPLOYER ID NO.:</b>	<b>ADDRESS:</b>	<b>FAX:</b>
<b>PAYMENT TERMS:</b>	<b>ADDRESS:</b>	<b>E-MAIL:</b>
<b>SHIPPING TERMS:</b>	<b>CITY, STATE &amp; ZIP CODE:</b>	<b>DATE:</b>
<b>F.O.B. DESTINATION-PREPAID AND ALLOWED</b>		
<b>QUOTE VALID UNTIL:</b>	<b>SIGNATURE:</b>	<b>Typed/Printed Name of Signor</b>

**SIGNATURE REQUIRED: This bid cannot be considered valid unless signed and dated by an authorized agent of the bidder. Type or print the information requested in the spaces provided.**

## INVITATION FOR BID

The University of Alabama requests sealed bids as per attached general and technical specifications or equal unless otherwise specified in the Special Conditions.

All Bidders submitting a bid must read all specifications carefully and respond accordingly. Failure to do so may eliminate your bid from consideration due to non-compliance.

### 1.0 GENERAL SPECIFICATIONS

- 1.1 Any contract resulting from this request will be made available to other eligible entities. This may include but is not limited to; The University of Alabama System, comprised of The University of Alabama; The UAB Enterprise, consisting of The University of Alabama at Birmingham, the UAB Health System and their related foundations and affiliates, and The University of Alabama in Huntsville, Huntsville, AL; and other state entities. Contracts resulting from the award of this request cover shipments by any entity listed above. Each entity will generate its own purchase orders, payments, etc. and delivery must be made according to the instructions on the purchase order.

The thrust of the contract is to obtain greater volume price discounts by combining the volume of purchases from participating entities within the State of Alabama.

- 1.2 All bid responses, technical information and any other attachments furnished to The University of Alabama in response to this request for quotation must be submitted in duplicate (THE ORIGINAL BID AND ATTACHMENTS WITH ORIGINAL SIGNATURE AND ONE EXACT COPY OF THE ENTIRE BID RESPONSE). Bidders who fail to follow this format may be disqualified from the evaluation and award phase of this bid.

- 1.3 The stated requirements appearing elsewhere in this solicitation shall become a part of the terms and conditions of any resulting contract. Any deviations there from must be specifically defined. If accepted by the University, the deviations shall become part of the contract, but such deviations must not be in conflict with the basic nature of this solicitation.

**Note: Bidders shall not submit their standard terms and conditions or purchase order terms as exceptions to or modification of the terms and conditions of this solicitation. Each exception to or modification of a University term and condition shall be individually listed by the bidder. Failure to follow this instruction may result in the determination that a bid submission is non-responsive to a solicitation and the rejection of that bid.**

- 1.4 The issuance of a University Purchase Order (P#) or a signed Contract document is required to constitute a contract between the successful Bidder and the University which shall bind the successful Bidder to furnish and deliver the commodities ordered at the prices, terms and conditions quoted and in accordance with the specifications of this Solicitation as well as the terms and conditions of the University's Purchase Order or Contract. No shipments are to be made to The University of Alabama without the issuance of a Purchase Order (P#). (Bidders are not to accept or ship items against a requisition number "R" #.)
- 1.5 Any questions concerning these specifications should be directed to the Buyer listed on the signature page.
- 1.6 No department, school or office at the University has the authority to solicit or receive official Solicitations nor authorize Solicitation or Contract changes other than the Purchasing Department. All solicitations are issued under the direct supervision of the Associate Director for Purchasing and in complete accordance with the State of Alabama Bid Law, Section 41-16-20 and University policies and procedures.
- 1.7 The terms and conditions included in this Solicitation along with any addenda, any University contract and/or University purchase order(s) issued referencing this Solicitation, the University's General Terms and Conditions, Instructions to Bidders shall constitute the entire and exclusive Contract between the University and the successful Bidder.

1.8 **State of Alabama Immigration Law Compliance****Compliance Notice.**

By submitting a proposal to this RFP, a Respondent agrees that it will fully comply with the State of Alabama Immigration Law (Act 2011-535), as amended. A Respondent also shall enroll in the E-Verify Program prior to performing any work, or continuing to perform any on-going work, and shall remain enrolled throughout the entire course of its performance of the contract awarded pursuant to this RFP. By signing this contract, the contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the state of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom." To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the University from any and all losses, consequential damages, expenses (including but not limited to, attorneys' fees), claims, suits, liabilities, fines, penalties, and any other costs arising out of or in any way related to Contractor's failure to fulfill its obligations contained in this paragraph or contained in the Alabama Immigration Law (Act 2011-535), as amended.

**State of Alabama Immigration Law (Act 2011-535)**

The successful contractor will be required to provide written certification they are in compliance with Section 9 of the State of Alabama Immigration Law (Act 2011-535).  
*One of the two required documents must be submitted prior to issuance of a University contract or purchase order. . Please complete and submit the form or document that applies to your company.*

**Complete this document only, if your company is not located in Alabama and your company does not have employees or subcontractors that work in the State of Alabama.**

- Certification of Compliance and affidavit forms included with this solicitation (*see Appendix – Certification of Compliance*)

**Complete the E-Verify document online, if your company is located in Alabama or your company has employees working in Alabama**

- Contractor's one-page E-verify Employment Eligibility Verification form (*see example included in Appendix - E-Verify*).

If you have previously enrolled in E-Verify, follow these instructions:

- Log onto [www.uscis.gov/everify](http://www.uscis.gov/everify)
- Click "Edit Company Profile" and print this one-page document.
- This one-page document must be submitted prior to a contract or purchase order being issued.

If you are **not** currently enrolled in E-Verify, follow these instructions:

- Log onto [www.uscis.gov/everify](http://www.uscis.gov/everify)
- Click "Getting Started" for information about the program, requirements, and enrollment process.
- Click "Enroll in E-Verify" and begin enrollment process.
- When enrollment process is complete, click "Edit Company Profile" and print this one-page document.
- This one-page document must be submitted prior to a contract or purchase order being issued.
- For further assistance please consult the [E-Verify Quick Reference Guide](#)

## 2.0 QUALIFICATIONS AND STANDARDS

Due to the importance of maintaining a safe University environment, it is imperative that the successful bidder meet certain qualifications that will guarantee The University of Alabama the successful Bidder is qualified to furnish and deliver products, equipment and services or furnish, deliver, install, service and/or repair equipment whichever is applicable as required in this Solicitation. In order for Bidders to qualify, the following requirements must be fulfilled:

- 2.1 The Bidder, if requested, must provide in writing, a statement that the Bidder has been regularly engaged in business for a minimum three (3) years engaging in furnishing, delivering, servicing, repairing and installing, equipment, goods, or services required in this Solicitation. In lieu of the minimum number of years in business, a performance bond may be required in the amount of one hundred (100%) percent of the contract price. This bond will be used to secure the completion of the project should the successful Bidder default for any reason. Failure to comply with this requirement may eliminate your bid response from consideration.
- 2.2 Each bidder required to provide a bond, shall submit a letter from a bonding agent licensed to do business in the State of Alabama stating that if the bidding company is the successful bidder, said bonding agent will furnish a 100% performance and payment bond covering and including products and service for the duration of the contract period. Said bond shall be subject to the approval and acceptance of The University of Alabama. The Letter and Bond shall be submitted to the University Purchasing Department and must be furnished within forty-eight (48) hours after request. The premium of the bond shall be paid by the successful bidder. Failure to provide the bond letter or bond will eliminate your bid from consideration in the bid award.

## 3.0 REFERENCES

References must include at least three (3) other universities, institutions or businesses, which the bidder has successfully provided products, services or installation of equipment similar to those required in this Solicitation in terms of manufacturer, size, features, service or type of installation. The references must include company name, address, project/delivery date, contact name, phone number, and email address.

## 4.0 PRODUCT SPECIFICATIONS

Specify all terms and conditions of the warranties associated with your products with your bid response.

## 5.0 PRICE QUOTATION

- 5.1 **IMPORTANT:** It is required that the PRICE QUOTATION SHEET(S) furnished with this Request for Price Quotation be completed and submitted with your proposal. **DO NOT** send generated price lists as your bid. Failure to comply with this request may eliminate your bid from consideration in the bid award.
- 5.2 All prices shall be quoted furnish and install (if applicable) FOB The University of Alabama, Tuscaloosa, AL 35487 prepay and allowed. Unit prices quoted must include any and all shipping and handling charges. Any freight claims will be the responsibility of the Bidder. The successful Bidder must transport at the time of set-up, the equipment and supplies necessary for this installation to campus. No direct shipments will be accepted.
- 5.3 It is the Bidder's responsibility to verify any information, measurements and obtain any clarifications prior to submitting the bid response. The University is not liable for any errors or misinterpretations made by the Bidder in response to this Solicitation.
- 5.4 The successful Bidder under the specifications required in this Solicitation shall furnish at its expense all equipment, labor, tools, supplies, transportation, insurance and other expenses necessary to fully perform any phase of the requirements of this Solicitation.
- 5.5 Quote prices firm for a period of ninety (90) days following the bid opening date unless otherwise stated in the Special Conditions. Bids that do not guarantee pricing firm for this period may be eliminated. Failure to quote the term for which your prices will remain firm may eliminate your bid from consideration.

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- 5.6 The quoted price must include but not be limited to all cables, wires, connectors, etc. to make a complete functioning unit unless specifically stated in the special conditions.
- 5.7 Include with your bid response complete details of your company's Return Merchandise policy, including, but not limited to, amount of any restocking fee required, procedures, limitations, contact person and phone number. While the University does not enter into any purchase with the intent to return items ordered, we do require this information be included with your bid response. Failure to include this information may be grounds for elimination of your bid from consideration.

### 6.0 DELIVERY, INSTALLATION AND TRAINING REQUIREMENTS

- 6.1 Proposed delivery dates shall be stated in number of calendar days after receipt of order.
- 6.2 All items must be delivered directly to the University by the successful Bidder and placed according to the instructions supplied by the University.

### 7.0 INSURANCE

- 7.1 See [General Terms and Conditions](#) for general Insurance Requirements, Additional Insurance requirements may be listed in the Special Conditions Section.
- 7.2 The successful Bidder shall provide the University Purchasing Department a certificate of insurance listing the required types of insurance and minimum liabilities specified in the [General Terms and Conditions](#) unless otherwise modified in the Special Conditions.
- 7.3 The certificate must be received by The University of Alabama Purchasing Department within three (3) days of request. Failure to comply with this request may eliminate your bid from consideration in the bid award.
- 7.4 The University reserves the right to terminate any resulting contract, if the Bidder fails to keep these policies in force for the above amounts or for the duration of the contract period.
- 7.5 The umbrella policy must be listed on the insurance certificate with an explanation of the coverage.

### 8.0 RESTRICTIONS ON COMMUNICATIONS WITH UNIVERSITY STAFF

From the issue date of this Solicitation until a Contractor is selected and a contract award is made, Bidders are not allowed to communicate about the subject of the IFB with any University administrator faculty, staff, or members of the Board of Trustees except:

- The Purchasing Department representative, any University Purchasing Official representing the University administration, or others authorized in writing by the Purchasing Office and
- University Representatives during Bidder presentations.

If violation of this provision occurs, the University reserves the right to reject the Bidder's response to this Solicitation.

## **9.0 SPECIAL CONDITIONS**

- 9.1 The University of Alabama is requesting sealed bids to furnish and deliver TRIMBLE NetR9 GNSS Reference Receiver as per attached Specification/Quotation Sheet or equal.
- 9.2 Delivery two (2) weeks after contractor's receipt of a purchase order. Specify in your bid if your company can meet this delivery requirement.
- 9.3 An electronic version of University's Terms and Conditions and instructions to Respondents are available through The University of Alabama website:

<http://purchasing.ua.edu/purchgenterms.html>

<http://purchasing.ua.edu/vendors/instructions-to-bidders.pdf>

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**10.0 QUOTE SHEET**

**SCOPE: THE UNIVERSITY OF ALABAMA REQUESTS SEALED BIDS TO FURNISH AND DELIVER TRIMBLE NETR9 GNSS REFERENCE RECEIVER PER ATTACHED GENERAL AND TECHNICAL SPECIFICATIONS OR EQUAL.**

**NOTES:**

- 10.1 The manufacturer and product number for each item that you are quoting must be completed for your bid to receive consideration.
- 10.2 **PLEASE INCLUDE PRODUCT/TECHNICAL SPECIFICATIONS FOR YOUR BID TO RECEIVE CONSIDERATION.**
- 10.3 All items must be fully warranted for a minimum period of the specified manufacturer's warranty. Service or replacements of any defective items are to be provided by the successful contractor at no charge to the University during the period of guarantee.
- 10.4 THE UNIT COST OF EACH ITEM must include any shipping and handling charges. Do NOT list shipping and handling as a separate charge. QUOTE FOB THE UNIVERSITY OF ALABAMA, TUSCALOOSA, AL 35487.

ITEM NO.	APPROX. QTY.	DESCRIPTION	UNIT COST	TOTAL COST
1.	8	(New) TRIMBLE NetR9 GNSS Reference Receiver Part No. 97503-18 TI-2 (modified) UNAVCO Upgradable CORS w/ ZG2 Antenna and 10m cable  ***SEE ATTACHED SPECIFICATIONS ***  MANUFACTURER _____ PRODUCT NO. _____	\$ _____	\$ _____

**OPTIONAL:**

2.	4 YRS	Extended Warranty – Infrastructure Hardware, Firmware, And Antenna (Per each Unit)  MANUFACTURER _____ PRODUCT NO. _____	\$ _____/YR	\$ _____
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**NOTE: Warranty on Equipment quoted:**

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Does warranty include parts & labor: \_\_\_\_\_ Yes \_\_\_\_\_ No



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**Delivery is needed in two(2) weeks.**

**Can you meet this delivery requirement:** \_\_\_\_\_ **Yes** \_\_\_\_\_ **No**

**If No, specify earliest delivery date:** \_\_\_\_\_

## 11.0 TECHNICAL SPECIFICATIONS

### **Item 1 – TRIMBLE NetR9 Global Navigation Satellite System (GNSS) Reference Receiver Model Ti-2 (Modified) with UNAVCO Upgradable CORS**

(SEE ATTACHED DATA SHEET)

#### **Modern CORS GNSS Receiver:**

##### **Specifications Requirements**

*Note: These specifications outline the requirements for a multi-frequency (GPS L1/L2, L2C, L5, GLONASS L1/L2, Space-Based Augmentation Systems – WAAS, EGNOS, MSAS, L-Band (Omnistar)), network compatible GNSS receiver for CORS reference station purposes.*

#### **Automatic Position Check Capability**

The receiver must be able to autonomously (with installation of firmware option) check position independently. The receiver must automatically flag if it has been moved.

#### **Accuracy**

Static

Horizontal 3mm + 0.1 ppm 3mm + 0.5 ppm 3mm + 0.5 ppm

Vertical 4mm + 0.4 ppm 6mm + 0.5 ppm 5mm + 0.5 ppm

Kinematic

Horizontal 8mm + 0.5 ppm not listed 10mm + 1 ppm

Vertical 15mm + 0.5 ppm not listed 15mm + 1 ppm

#### **Environmental Requirements of the GNSS Receiver**

##### **Environmental Requirements**

- Unit must have a Magnesium housing to resist corrosion in a humid or sea-air environment

#### **Power requirements of the GNSS Receiver**

##### **Power Requirements**

- The GNSS receiver must have Power Over Ethernet (PoE) provided by a Class 3 PoE supply
- \* The GNSS receiver must have a voltage input range of 9.5 VDC to 57 VDC
  - \* Benefit – Higher voltages allow for lower current. Cables needed for connection may be smaller and save cost (higher voltage uses less current – less current uses smaller gauge power wire).

#### **Memory Requirements of the GNSS Receiver**

##### **Internal Data Storage**

- \* The GNSS receiver must have internal 8 GB data storage, fully protected from sand, dust, moisture and 100% non-condensing humidity proof
- \* The internal memory must not be removable
- \* The GNSS receiver must be capable of 50Hz storage rate or greater

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- \* The GNSS receiver must be capable of 8 concurrent, independent storage sessions with memory pooling for each
- \* The GNSS receiver must have a web utility that will provide a commonly available internet mapping/photogrammetry service such as Google to allow for automatic export and marking of positions on internet service maps. KML format data will interface directly with Google.
- GNSS receiver must be able to time-synchronize other equipment using NTP Server interface.

### **Interfaces**

- Unit must have a scriptable command line interface
- Unit must have built-in email notification capability
- Unit must be capable of BINEX (7f-05) support
- Unit must have NTRIP Caster capability
- Unit must have an NTRIP client capability
- GNSS receiver must be able to time-synchronize other equipment using NTP Server interface.
- Unit must have capability to operate NTRIP & Client
- Unit must have UDP support
- Unit must have 10 TCP/IP ports
- Unit must have USB interface
- Unit must have Bluetooth communications

### **Display & Keyboard**

2-line/16 character 7-  
button+power LED

### **GNSS Signal**

#### **Tracking**

- *Unit must have built-in PPP capability*

#### **Channels**

\*The GNSS receiver must have a total of 440 channels

Future signals to consider

GNSS (Global Navigation Satellite Systems) Constellations

GPS: USA, 21 + 3 SVs, 2 orbits every 1 sidereal day, CDMA

11 IIA + 12 IIR + 8 IIR-M (L2C) Last launch 8/2009

Block IIF launch (L5) May 2010

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GLONASS: Russia, 21 + 3 SVs, 17 orbits every 8 sidereal days, FDMA  
18 fully operational + 1 L1-only + 2 in maintenance mode  
6 more launches scheduled 2010.  
Galileo: ESA, 27 + 3 SVs, 5 orbits every 3 sidereal days, CDMA  
GIOVE-B only  
Full constellation 2014?  
Beidou-2/Compass: China, 30 MEO + 5 GEO SVs,  
MEO at 13 orbits every 7 sidereal days, CDMA  
2 GEO VEs (1 operational) + 3 GEO + 1 MEO  
Asia coverage 2011?  
SBAS: geosynchronous = 1 orbit every 1 sidereal day, CDMA  
WAAS - USA (4)  
EGNOS - ESA (4)  
MSAS - Japan (2)  
GAGAN - India (2)

### Operational requirements

#### **Control**

- \* System must have fully self contained ftp Server capability
- \* System must be capable of operating as DynDNS Client
- \* System must be capable of email file push

**GNSS hardware and software must have proven compatibility between all components of the whole system.**

#### Design & Architecture of the software :

The GNSS software must use the latest technology available :

##### Client/Server Architecture :

- Must run automatically and continuously as a windows service under Windows™ 2008 Server.
- 64bit operating system supported
- Software Services shall start automatically with other services when booting.
- The software must allow to be used with Microsoft Azure cloud, either by:
  - a. Using Microsoft Azure SQL as the data base for the system
  - b. Installing the complete software installation in Microsoft Azure Cloud
- The software must support installation in virtual environments including Microsoft Hyper-V and VMWare.
- The software must allow to be used with Microsoft Azure cloud, either by:
  - Using Microsoft Azure SQL as the data base for the system
  - Installing the complete software installation in Microsoft Azure Cloud
  - The operator does not need to be logged into Windows™.
  - If power fails, the software will restart immediately when the power returns and the computer reboots.
  - Shall have fast and efficient multiple-user access to its own database.

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Graphical User-Interface :

- The client application shall have a “graphical user interface”, with typical Windows™ look and feel, that controls the server. It should be able to be installed on remote PC's as well as on the server.
- Easy to learn and use and Self-explanatory panels, boxes, windows, toolbars
- Easily accessible for remote and on-site system supervisors
- Map-views must include background map for a better visibility of the network.
- “Drag and Drop” for better configuration and organization of system setup in UI

Three access levels Administrators, User and Guest :

- The Software shall have three access level Administrator, User and Guest. Administrators (system supervisors) must have full control of software and the receivers.
- Administrators must be able to start and stop the various operations, create and change configurations, set parameters and modes etc.
- One Administrator shall be the support team of the Contractor for remote-maintenance;
- The User security level allows the modification and configuration of operation relevant settings
- Operators change log; all configuration changes must be logged in a database so the performed changes can be assigned to when and who did the change
- The Software shall have the capability to grant other interested parties viewer-only rights (Guest).
- Viewers should only be able to inspect the operation of the software, configuration parameters, system and receiver status etc..
- Viewers should not be able control the software and its operation.

The GNSS software must perform the minimum tasks as described below :

Controls GNSS receivers, directly and remotely:

- The GNSS Software shall poll the RS receivers through an active connection and stream raw data as well as download data files without any interaction on local RTK and DGPS data that may be transmitted from reference stations to RTK rovers.
- Remote Firmware upgrades of the receivers must be possible using the software
- Communication between the server and the reference-station receivers must have the flexibility to operate as :
  - Dial-up modem (landline/cellular/GSM/high-speed wireless);
  - Internet, intranet, local or wide area networks (TCP/IP),
  - Direct serial link (RS232)
- Streaming of raw data from remote receiver shall be done either via :
  - a. Binary raw data,
  - b. RTCM v3.x

*Configures the receiver internal and local RTK transmission using various channels*

The GNSS Software must be able to perform the following Receiver configuration :

- General receiver settings
- Satellite tracking parameters
- Data logging parameters

*Downloads raw data, analyzes , reformats , archives and distributes GPS data via a ftp and web server*

The GNSS Software must perform the following tasks automatically and periodically at user-defined times and intervals :

- Retrieve primary logged data files

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- Check all downloaded data for completeness and retrieve missing data automatically from the internal receiver memory
- Convert to RINEX or to Hatanaka compact RINEX
- Perform Splitting, appending and decimating data as required by Administrator
- Archive files, Clean-up files after user-defined period of time for user defined file types based on two mechanisms; remaining free disk space and file age
- Distribute files to FTP or WEB servers for easy access by the GPS user community

*Generates event logs, alarms & warnings on receiver status, network status and data quality status*

The GNSS Software shall perform the system monitoring and data control :

- Monitors the various communication links and the operation of the entire system.
- Records critical events in the system SQL database and Windows Event log
- Checks the completeness of all data downloaded from the reference-station receivers.
- Generates warnings and e-mail messages to selected supervisors if any unexpected events occur.
- Watchdog support for automated restart of services in case of failure

Distributes single RTK corrections to field users via various distribution channels.

The GNSS Software shall provide access to the following communication channels:

- Provisional dial-up via individual land-line modems,
- Provisional dial-Up via cellular/GSM modems and a multiplexer.
- Provisional Radio modems (Satel, Pacific Crest,...) in case of one-way corrections like single base RTK.
- Internet, intranet, local or wide area networks (TCP/IP) or with Mobile Cellular GPRS or Wireless technology using RTCM standard NTRIP 1.0 and NTRIP 2.0

The GNSS Software shall also provide the following Real-time Product configuration :

- a. Settings for RTK transmission format (RTCM 2.x, RTCMv3.x)
- b. Settings for DGPS transmission format (RTCM 2.x)
- c. Management of Automatic site selection depending of the rover's position.
- d. Rover Position will be received in NMEA format.
- e. Creation and Management of Multiple Real-time Products (independent rate and format)

*Manages and controls end-users access to the different File Products services via Web Server*

The GNSS Software shall provide the following User Management Services :

- Clients can register online
- Once the registration is accepted by the administrator, clients can access the web server services according to their specific authorisation
- Data can be requested as necessary for specific needs by simply selecting the required time interval, data rate, file format and station(s)
- Easy station selection either by individual station or graphically from a map
- VIRTUAL data files can be generated by entering the required time interval, data rate, file format and position
- All download transactions are logged so can easily be used for final billing to clients
- Charges for data downloads can be configured by the administrator
- User Management control is independent from network processing operation
- Subscriptions and Contracts are predefined and customizable; renewals of subscriptions are managed and monitored automatically

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TRIMBLE NetR9 GNSS REFERENCE RECEIVER

- Clients can preview what their likely data costs will be

The GNSS Software (web server part) shall also provide Automatic Station Quality Control and Network Quality Control :

- Possibility to graphically view the station health status on the web server .
- Possibility to represent ionospheric and tropospheric residuals.

Manages and controls end-users access to the different Real-Time services

The GNSS Software shall provide the following User Management Services:

- Central Management of a User Database with registration of new Real-Time users with different levels of Authentication and Authorization,
- Registration of Real-time users and Authentication using :
  - Username/password in case of ftp/web access of File Products,
  - Field phone number (GSM,...)
  - NTRIP username and password in case of NTRIP based services,
- Possibility for one user to access the Real-time Services by using one or several channels within the same registration.
- Authorization based on an individual list of real-time products for each registered user.
- Mobile Browser Support; micro browser on mobile devices can be used to display network status messages in the field
- Possibility to define a time-expiry date for any license
- Possibility to define a maximum number of licenses per user-account.

The GNSS Software shall also provide the following minimum information for Accounting at BENEFICIARIES:

- General Log file monthly based with the following information :
  - a. Name of user
  - b. Date & Time of connection,
  - c. Type of Real-time Service required,
  - d. Length (duration) of connection
- Possibility to generate an invoice based on these information and user's registration information.
- Possibility to de-activate/re-activate individual users account temporarily.

The GNSS Software shall also provide the following minimum information so that to provide individual auditing:

- Detailed log file for all user connection including the following information for each connection in Html format :
  - a. Name of User
  - b. Date & Time of connection,
  - c. Type of Real-time Service required,
  - d. Length (duration) of connection
  - e. Status of rover (Position, RTK fix...) at each change
  - f. Termination of connection (user or Administrator).
- This information is intended for auditing purposes for the BENEFICIARIES hot-line Service from GNSS Network central desk.

*Computes in real-time a global adjustment of the network for best estimation of all GPS errors*

- GNSS Software shall apply Ocean Tide Loading and Earth Tide Loading

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TRIMBLE NetR9 GNSS REFERENCE RECEIVER

The GNSS Software shall connect the remote receivers and stream raw data without any interaction on local RTK and receiver configuration and provide the following features :

- Processing kernel should apply the zero-differences-based algorithms for the global real-time adjustment of the network for better reliability and robustness.
- Use of all stations available within the network to compute a model of distant-dependant errors and to compute corrections designed to compensate for these errors.
- Minimum the following two Network-RTK standard method (RTCM standard) should be supported:
  - a. Concept of Virtual Reference Stations (VRS)
  - b. MAC (Master Auxiliary Concept)
    - i. All measurements from all stations of the network have to be reduced on the same level of ambiguity.
  - c. FKP (Flächenkorrekturparameter) in RTCM 3.1
- Use of minimum cut-off angle of 10° or more.
- Use of GNSS predicted ephemeris from the University of Bern and IGS as well as broadcast ephemeris
- Possibility to split the network in clusters so that to have either a central or a distributed installation (for provisional backup or redundancy).
- Allows the Network RTK solution to be valid even outside the polygon of Reference Stations up to 20km.
- The software must use individual reference station velocities in the network processing
- The software package must use DCB files in Ionosphere modelling
- The software must be able to calculate the TEC (Total Electron Content) and Ionosphere Scintillation in real-time

*Generates Network RTK and DGPS corrections for end-users following different service levels*

The GNSS Software shall generate different type of corrections to allow different kind of services :

- DGPS corrections in RTCM v2.x format
- RTK corrections in various standard format (RTCM v2.x, RTCM v3.x)
- Single RTK corrections from specific stations
- Single RTK corrections from nearest station (needs to receive user's position via NMEA string).
- Network RTK individual corrections using the RTCM standard Virtual Reference Station concept (needs to receive user's position via NMEA string).
- Individual Network RTK corrections are given either in RTCMv2.x or RTCMv3.x format.
- Automatic selection of best cell for Network RTK corrections using the RTCM standard MAC corrections based on user's position. It means That a group of users working in the same area will receive the same corrections.
- All Real-time corrections shall be given in the International Recognized Standard called RTCM. RTCM messages in version 2.x and 3.x only are allowed. Any deviation to this standard is not recommended.

The software package must offer to distribute make the following data available to user and/or administrators in the field using mobile Apps for Apple IOS and Android operated Tablets and mobile phone:



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TRIMBLE NetR9 GNSS REFERENCE RECEIVER

Reference station activity including but not limited to:

- Skyplot
- Tracked and solved satellites
- PDOP
- Remaining residuals of Ionospheric and Tropospheric modelling

Data subscription:

- Usage of data services
- Expiry date of subscription
- Date, time and length of sessions

System Administration:

- Software activity and health status
- Connected users and solution station of RTK users
- Windows Service operation and remote restart functionality for services

# DATASHEET

## TRIMBLE NetR9 GNSS REFERENCE RECEIVER SERIES

### KEY FEATURES

Proven GNSS technology from Trimble

440 channels for unmatched GNSS tracking performance

Bluetooth®, Ethernet, Serial and USB support

Position Monitoring and Alerting functionality notifies of any change in antenna position

Large capacity internal memory plus external USB device logging capability

Convenient front panel display and configuration

Power over Ethernet (PoE) technology

Twelve independent logging sessions

Multiple data file formats

Integrated battery which can act as a primary power source or as an uninterrupted power supply (UPS) backup

Powerful remote configuration and access

RTX™ World Wide Correction Service ready

The Trimble NetR9 Global Navigation Satellite System (GNSS) reference receiver series consists of full-feature, top-of-the-line receivers designed to provide network operators with maximum features and functionality from a single receiver platform.

Using the latest generation of Trimble 360 receiver technology in combination with two Trimble Maxwell™ 6 chipsets, the Trimble NetR9 reference receiver offers an industry-leading 440 channels for unmatched GNSS multi-constellation tracking performance. With the world's GNSS in constant development, the Trimble NetR9 reference receiver provides the operator with the assurance that it has the capability to grow with the industry, both today, and well into the future.

The Trimble NetR9 reference receiver supports a wide range of satellite signals. Currently, the NetR9 platform is capable of tracking signals from GPS, GLONASS, Galileo<sup>1</sup>, Beidou, and QZSS constellations. With 440 channels, the NetR9 has the capacity to accommodate additional signals as they may become available, eliminating the need to replace hardware to keep pace with technology<sup>2</sup>.

The Trimble NetR9 reference receiver supports the new CMRx communications protocol, which provides unprecedented GNSS correction compression for optimized bandwidth and low latency data transmission. Combined, this results in greater data throughput at a lower operating cost.

The Trimble NetR9 reference receiver's compact form factor, low power consumption and powerful network capabilities make for an ideal combination supporting a wide range of high-accuracy positioning applications. A few specific examples include:

- Trimble VRS™ network receiver
- Mobile field base station
- Academic research
- Continuously Operating Reference Station (CORS)
- Field campaign receiver for post-processing applications
- Use in DGPS MSK beacon systems
- Monitoring integrity of VRS networks, along with other physical infrastructure such as oil platforms, mines, dams, bridges, or other natural and man-made objects where precise deformation is crucial

The Trimble NetR9 reference receiver has eight gigabytes of physical memory built into the circuit board, providing a high level of data protection. Additionally, the use of external USB logging devices is supported providing the Trimble NetR9 reference receiver unparalleled

storage capacity and flexibility. Combined with logging of T02, RINEX, BINEX, and Google Earth formats, factored together with FTP and Email Push technology, the Trimble NetR9 achieves an uncompromised blend of functionality and efficiency.

With stringent environmental specifications and an integrated lithium-ion, the Trimble NetR9 protects to ensure no data is missed. The integrated Li-Ion battery can power the Trimble NetR9 continuously up to 15 hours, either as a primary power source or as an emergency backup source.

The Trimble NetR9 reference receiver comes with powerful built-in remote management. Utilizing Internet Protocol (IP) as the primary communications mechanism, the familiar Trimble Infrastructure web user interface provides full receiver status, configuration, firmware updates, data access, as well as a variety of security levels and access controls. Furthermore, the receiver supports Email Alerts so the operator knows exactly what is taking place at the receiver. This includes integrated position monitoring so as to always know if your antenna has moved before it is too late.

For simple hands-on configuration, the Trimble NetR9 reference receiver offers a seven-button, two line display and status information so that performing in-field configuration is practically effortless. Best of all, no handhelds are required to get this job done.

Available in three upgradable configurations (NetR9 Ti-1, Ti-2, and Ti-3) along with one non-upgradable configuration (NetR9 Ti-M), the NetR9 provides the most flexible receiver platform offered to date. With the NetR9 receiver platform's robust functionality, you can trust Trimble to provide the very latest technology in the GNSS industry to help position your way into the future.

1.1. Developed under a License of the European Union and the European Space Agency.

2.2. For more information about Trimble and GNSS modernization, please visit [http://www.trimble.com/srv\\_new\\_era.shtml](http://www.trimble.com/srv_new_era.shtml).



## SATELLITE TRACKING

- Two advanced Trimble Maxwell 6 GNSS chipsets for a total of 440 channels
- Trimble EVEREST™ multipath signal rejection
- Trimble 360 receiver technology
- Trimble R-Track™ technology
- High precision multiple correlator for GNSS pseudorange measurements
- Unfiltered, unsmoothed pseudorange measurements data for low noise, low multipath error, low time domain correlation and high dynamic response
- Proprietary Receiver Autonomous Integrity Monitor (RAIM) system to detect and reject degraded signals to improve position quality.
- Very low noise GNSS carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
- Signal-to-noise ratios reported in dB-Hz
- Proven Trimble low elevation tracking technology
- Current satellite signals tracked simultaneously:
  - GPS: L1 C/A, L2C, L2E (Trimble method for tracking unencrypted L2P), L5
  - GLONASS: L1 C/A and unencrypted P code, L2 C/A and unencrypted P code, L3 CDMA<sup>2</sup>
  - Galileo<sup>3</sup>: L1 CBOC, E5A, E5B & E5AltBOC
  - Beidou<sup>4</sup>
  - QZSS: L1 C/A, L1C, L1 SAIF, L2C, L5, LEX<sup>5</sup>
  - SBAS: L1 C/A (EGNOS/MSAS), L1 C/A and L5 (WAAS),
  - L-Band: OmniSTAR VBS, HP and XP
  - Trimble RTX World Wide Corrections

## INPUT/OUTPUT FORMATS

- Correction Formats:
  - CMR, CMR+, CMRx, RTX, RTCM 2.1, RTCM 2.2, RTCM 2.3, RTCM 3.0, RTCM 3.1
- Observables:
  - RT17, RT27, BINEX, RTCM 3.x
- Position/Status I/O:
  - NMEA-0183 v2.30, GSOE
- Up to 50 Hz Output
- 10 MHz External Frequency Input
  - Normal input level 0 to +13 dBm
  - Maximum input level +17 dBm, ±35 V DC
  - Input impedance 50 Ohms @ 10 MHz; DC blocked
- 1 PPS Output
- Event Input
- Met/Tilt Sensor Support

## POSITIONING PERFORMANCE<sup>6</sup>

### Code Differential GNSS Positioning

Horizontal .....	0.25 m + 1 ppm RMS
Vertical .....	0.50 m + 1 ppm RMS
WAAS differential positioning accuracy <sup>7</sup> .....	typically <5 m 3DRMS

### Static GNSS Surveying

#### High-accuracy static

Horizontal .....	3 mm + 0.1 ppm RMS
Vertical .....	3.5 mm + 0.4 ppm RMS

#### Static & Fast Static

Horizontal .....	3 mm + 0.5 ppm RMS
Vertical .....	5 mm + 0.5 ppm RMS

### Real Time Kinematic Surveying<sup>8</sup>

#### Single Baseline <30 km

Horizontal .....	8 mm + 1 ppm RMS
Vertical .....	15 mm + 1 ppm RMS

#### Networked RTK

Horizontal .....	8 mm + 0.5 ppm RMS
Vertical .....	15 mm + 0.5 ppm RMS
Initialization time .....	typically <10 seconds
Initialization reliability .....	typically >99.9%

## COMMUNICATION

- Serial Ports
  - One D9 Male, EIA-574 RS-232C/V.24 Full 9 wire serial
  - One Lemo 7 pin 0shell, 3 wire serial with power input, 1 PPS output and event input
  - One Mini B USB 5 pin; supports Device and Host mode operations
- Bluetooth<sup>9</sup>
  - Integrated 2.4 GHz Bluetooth; supports 3 simultaneous connections
- Ethernet
  - Integrated RJ45 jack
  - Full-duplex, auto-negotiate 100Base-T
  - Power over Ethernet (PoE) support with a Class 3 PoE supply
  - HTTP, HTTPS, TCP/IP, UDP, FTP, NTRIP Caster, NTRIP Server, NTRIP Client
  - Proxy server support
  - Routing table support
  - NTP Server, NTP Client support
  - UPnP and Zeroconf support
  - Email Alerts and File Push
  - Position Monitoring
  - IP Filtering

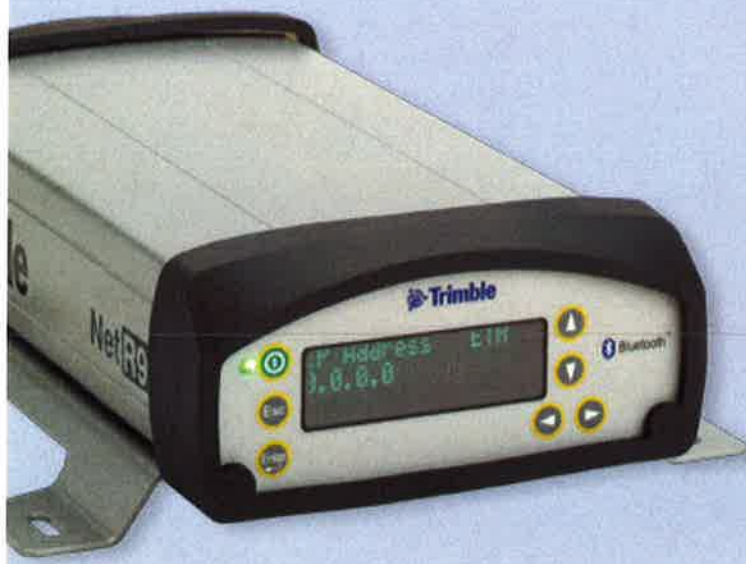
## DATA LOGGING

### Storage Capacity

Onboard memory .....	8 GB
External memory <sup>10</sup> .....	greater than 1 TB
Maximum logging rate .....	50 Hz
File durations .....	5 minutes to continuous
Storage sessions .....	12 concurrent independent sessions with dedicated memory pooling and ring buffers
File formats .....	T02, RINEX v2.xx, RINEX v3.xx, BINEX, Google Earth KMZ
File naming options .....	multiple
Data retrieval and transfer .....	HTTP, FTP Server, USB, FTP Push and Email Push
Events .....	definable file protection on events

## PHYSICAL SPECIFICATIONS

Dimensions (L x W x H) .....	26.5 cm x 13.0 cm x 5.5 cm (10.43 in x 5.12 in x 2.16 in)
Weight .....	1.75 kg (3.85 lb)





## ENVIRONMENT

Certification	IP67 and MIL-STD 810F
Operating temperature <sup>11</sup>	-40 °C to +65 °C (-40 °F to +149 °F)
Storage temperature	-40 °C to +80 °C (-40 °F to +176 °F)
Humidity	100% condensing
Shock	Survival: Non-operating 75 g, 6 ms; Operating: to 25 g, 10 ms, sawtooth; designed to survive a 1 m drop onto hard surface
Vibration	Operating: 7.5 Hz to 350 Hz 0.015 g <sup>2</sup> /Hz, 350 Hz to 500 Hz 0.006 g <sup>2</sup> /Hz -6dB/Octave; Non-Operating: 10 Hz to 300 Hz 0.04 g <sup>2</sup> /Hz 300 Hz to 1000 Hz -6 dB/Octave
Ingress protection	IP67; waterproof for temporary immersion to a depth of 1 m (3.28 ft); dustproof

## USER INTERFACE

- **Front Panel Display**
  - 2-line x 16-character vacuum fluorescent display
  - Advanced power saving modes
  - Escape and Enter key for menu navigation
  - 4 arrow keys (up, down, left and right) for scrolling and data entry
  - Power button and indication LED
- **Web User Interface**
  - Secure
  - Allows remote configuration, data retrieval and firmware updates
- **Programmatic Interface**
  - Allows for open, non-proprietary access, control and configuration

## ANTENNA SUPPORT

Output voltage.....	5.0 V DC nominal
Maximum output current.....	150 mA
Maximum cable loss.....	12 dB
Recommended antennas.....	Trimble Zephyr Geodetic™ 2, Trimble GNSS Choke Ring, Trimble GNSS-Ti Choke Ring, Ag25 (for use with Ti-M variant only)

## SECURITY

- Optional HTTP login
- HTTPS
- Real-time stream authentication
- Programmatic interface authentication

- NTRIP

## ELECTRICAL

- Power over Ethernet (PoE) 802.3af; requires a Class 3 PoE supply
- 9.5 V DC to 28 V DC input on Lemo port
  - User-configurable power-on voltage
  - User-configurable power-down voltage
- Integrated internal battery 7.4 V, 7800 mA-hr, Li-Ion; 15 hours of continuous operation, dependent on user settings
- Internal battery operates as a UPS in the event of power source outage
- Seamless switching between external/internal power sources
- Internal battery will charge from external power source when input voltage is >12 V DC
- Integrated charging circuitry
- Power consumption 3.8 W nominal, dependent on user settings

## REGULATORY COMPLIANCE

- RoHS
- China RoHS
- FCC Part 15.247 FCC certifications
- Class B Device FCC Part 15 and ICES-003 compliance
- RSS-310 and RSS-210 Industry Canada compliance
- CE mark compliance
- C-Tick mark compliance
- UN ST/SG/AC.10.11/Rev. 3, Amend. 1 (Li-Ion battery)
- UN ST/SG/AC.10/27/Add. 2 (Li-Ion battery)
- WEEE

1. NetR9 available in four configurations: Ti-1, Ti-2, Ti-3, and Ti-M. Specifications shown reflect full configuration capability. Please consult your local distributor for additional information.
2. There is no public GLONASS L3 CDMA ICD. The current capability in the receivers is based on publicly available information. As such, Trimble cannot guarantee that these receivers will be fully compatible with a future generation of GLONASS satellites or signals.
3. Developed under a License of the European Union and the European Space Agency.
4. At the time of this publication, no public Beidou ICD was available. The current capability in the receivers is based on publicly available information. As such, Trimble cannot guarantee that these receivers will be fully compatible with a future generation of Beidou satellites or signals.
5. Pilot observable.
6. Accuracy and reliability may be subject to anomalies due to multipath, obstructions, satellite geometry, and atmospheric conditions. The specifications state recommend the use of stable mounts in an open sky view, EMI and multipath clean environment, optimal GNSS constellation configurations, along with the use of survey practices that are generally accepted for performing the highest-order surveys for the applicable application including occupation times appropriate for baseline length. Baselines longer than 30 km require precise ephemeris and occupations up to 24 hr may be required to achieve the high accuracy static specification.
7. Depends on WAAS/EGNOS system performance.
8. NetR9 limited to 1,000 m RTK baseline length. Networked RTK PPM values are referenced to the closest physical base station.
9. Bluetooth type approvals are country specific. Contact your local authorized Trimble distribution partner for more information.
10. USB device minimum recommended specification must support USB 2.0 Hi-Speed with a minimum write speed of 6 Mbps. Solid state drives recommended for optimal performance.
11. The internal battery will operate from -10 °C to +55 °C (14 °F to +131 °F). The internal battery charger will operate from 0 °C to 45 °C (32 °F to 113 °F). All temperatures listed reference the ambient temperature.



# NetR9 MODEL COMPARISON

The NetR9 reference receiver is available in three configurations, the NetR9 TI-1 (fully featured), the NetR9 TI-2 (fully upgradable), and the NetR9 TI-3 (fully upgradeable). Any option which is not part of the standard Ti-x package may be upgraded at any time to enable functionality, increase memory, or increase logging rates, to a maximum equal to that of the NetR9 TI-1 offering. The enabled options of each package are as follows:

FEATURE	NetR9 TI-3	NetR9 TI-2	NetR9 TI-1
Channels	440	440	440
Data tracking/storage rate	1 Hz	20 Hz	50 Hz
On-board storage size	0 GB	4 GB	8 GB
GPS L1/L2 signal processing	✓	✓	✓
GPS L2C signal processing	×	✓	✓
GPS L5 signal processing	×	✓	✓
GLONASS signal processing	×	×	✓
Galileo signal processing	×	×	✓
Compass signal processing	×	×	✓
QZSS signal processing	×	×	✓
CMR/CMR+ Input	×	×	✓
CMR/CMR+ Output	×	✓	✓
CMRx Input	×	✓	✓
CMRx Output	×	✓	✓
RTCM Input	×	✓	✓
RTCM Output	×	✓	✓
Advanced RTCM Output	×	✓	✓
Event Marker	×	✓	✓
NMEA	×	✓	✓
Bluetooth	×	✓	✓
External USB Support	×	✓	✓
RTK	×	✓	✓
Integrated USB support	×	✓	✓
Programmatic Interface	×	×	✓
Position Monitoring	✓	✓	✓



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**NORTH & SOUTH AMERICA**  
Trimble Infrastructure Division  
10355 Westmoor Drive, Suite 100  
Westminster, CO 80021 • USA  
800-480-0510 (Toll Free)  
+1 720-887-6100 Phone  
+1 720-887-6101 Fax

**EUROPE, MIDDLE EAST  
& AFRICA**  
Trimble Germany GmbH  
Am Prime Parc 11  
65479 Raunheim • GERMANY  
+49-6142-2100-0 Phone  
+49-6142-2100-550 Fax

**ASIA-PACIFIC**  
Trimble Navigation  
Singapore Pty Limited  
80 Marine Parade Road  
#22-06, Parkway Parade  
Singapore 449269 • SINGAPORE  
+65-6348-2212 Phone  
+65-6348-2232 Fax

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### Organization Designation:

**Employer Category:****Federal Contractor Category:****Employees being verified:****NAICS Code:**[View/Edit](#)**Total Hiring Sites:**[View/Edit](#)**Total Points of Contact:**[View/Edit](#)[View MOU](#)



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Signature of Authorized Agent of Contractor/Grantee

Date: \_\_\_\_\_

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